



UNITED STATES AIR FORCE

OCCUPATIONAL REPORT



NAVIGATOR UTILIZATION FIELD

AFSC 12XXX

OCTOBER 1999

**OCCUPATIONAL ANALYSIS PROGRAM
AIR FORCE OCCUPATIONAL MEASUREMENT SQUADRON
AIR EDUCATION AND TRAINING COMMAND
1550 5TH STREET EAST
RANDOLPH AFB, TEXAS 78150-4449**

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TABLE OF CONTENTS

	<u>PAGE NUMBER</u>
PREFACE	iv
SUMMARY OF RESULTS	vi
INTRODUCTION	1
Background.....	1
SURVEY METHODOLOGY	2
Subject-Matter Expert Interviews	2
SPECIALTY JOBS (Utilization Field Structure).....	3
I. Airlift Navigator.....	3
II. Reconnaissance/Surveillance Navigator and Electronic Warfare Officer (EWO).....	6
III. Special Operations Navigator, Fire Control Officer, and EWO.....	11
IV. Tanker Navigator.....	15
V. Fighter Weapon Systems Operator (WSO) and EWO	17
VI. Bomber Navigator and EWO.....	20
VII. Experimental Test Navigator.....	25
VIII. Generalist Navigator	25
IMPLICATIONS	26

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PREFACE

This is an occupational report of the Navigator utilization field, Air Force Specialty Code (AFSC) 12XXX. Copies of this are distributed to the Air Force Functional Manager, the operations training locations, all major using commands, and other interested operations and training officials.

Captain Jason Gibson conducted the subject-matter expert (SME) interviews and wrote the final report. This report has been reviewed and approved by Mr. Joseph Bergmann, Chief, Management Applications Section, Occupational Analysis Flight, Air Force Occupational Measurement Squadron (AFOMS).

You may obtain additional copies from AFOMS/OMYXI, 1550 5th Street East, Randolph Air Force Base, Texas 78150-4449, or by calling DSN 487-5543. For information on the Air Force occupational survey process or other on-going projects, visit our web site at <http://www.omsq.af.mil>.

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SUMMARY OF RESULTS

1. **Study Overview:** The Navigator utilization field was studied to better understand the work performed by AFSC 12XXX personnel within the different weapon systems which exist within the Air Force inventory. This analysis was conducted in order to develop information to be used by prospective navigator trainees when seeking to determine which navigator job they would like to pursue.
2. **Specialty Jobs:** The Navigator utilization field is separated into two main divisions: navigators (sometimes referred to as Weapon Systems Operators or WSOs) and Electronic Warfare Officers (EWOs). Numerous subsets of jobs for navigators and EWOs exist within these two distinct divisions. Subsequently, navigator training is separated into two major training pipelines: Airlift/Tanker navigator and EWO training performed at Randolph AFB, and Fighter/Bomber navigator training conducted at Naval Air Station (NAS) Pensacola. Each initial flying job and the respective training pipeline is described within this report. No gender exclusion exists within either training pipeline for navigators.
3. **Utilization Field Progression:** Progression for officers within this specialty is fairly consistent across weapon systems. Officers within the company grade officer (CGO) ranks perform technical aeronautical work within a given weapon system and should have an opportunity to upgrade to instructor and evaluator positions. Officers can expect to fly and perform technical duties throughout the larger portion of their careers. Field grade officers (FGOs) continue upon a track of technical performance, but begin to assume roles of flight commanders, staff officers, and squadron commanders.
4. **Implications:** The AFSC 12XXX utilization field is very diverse. Because officers can possibly perform work within a number of different aircraft, potential navigator candidates must consider the work performed within each shred of the specialty, the relative number of officers in each shred, and roles of the aircraft flown, and then make a decision on the type of navigator training they wish to pursue.

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**OCCUPATIONAL REPORT
NAVIGATOR UTILIZATION FIELD
AFSC 12XXX**

INTRODUCTION

This is a report describing the Navigator utilization field conducted by the Air Force Occupational Measurement Squadron (AFOMS). This is a "modified" study in that no formal statistical job analysis was conducted. Instead, SME interviews were conducted and applicable Air Force instructions and publications were referenced to complete the analysis. The Air Education and Training Command, Director of Operations (AETC/DO) requested this study in order to provide prospective navigator candidates with pertinent information for making a navigator training pipeline selection prior to attending formal training.

Background

In 1999, the Air Force formally split all common navigator entry-level training into two distinct training pipelines, each with two tracks: Randolph AFB pipeline (airlift/tanker navigator and EWO training) and NAS Pensacola pipeline (fighter and bomber navigator training). Previously, all new navigator trainees attended initial training at NAS Pensacola. However, due to this split in training, currently all airlift/tanker navigator and EWO training is conducted at Randolph AFB. Similarly, all fighter and bomber navigator training is conducted at NAS Pensacola. Since two training pipelines now exist for prospective trainees, future navigators must decide which pipeline they would like to pursue to get them to their desired weapon system. Currently, officers and cadets considering becoming a navigator are asked to state their preference if they wish to become an airlift/tanker navigator, EWO, fighter WSO, or bomber navigator. However, the needs of the Air Force and performance in navigator training will ultimately determine one's assigned position and aircraft. This document seeks to educate prospective navigators on the **type of work** officers perform within the different weapon systems, provide a **description of the different weapon systems** they will likely fly, and give a **description of the career progression** they will likely encounter within each shred of the specialty.

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STUDY METHODOLOGY

SME Interviews

In order to study a given Air Force Specialty, AFOMS conducts SME interviews in order to learn what work is done. In this particular case, SME interviews were conducted with 15 officers who are currently working in navigator training-related or operational billets throughout the Air Force. A list of the bases and organizations from which officers were interviewed is given below:

TABLE 1

BASES AND UNITS OF PERSONNEL INTERVIEWED DURING OCCUPATIONAL ANALYSIS PROJECT

BASE	COMMAND/ ORGANIZATION
Dyess AFB	28th Bomb Squadron
Hurlburt Field	15th Special Operations Squadron
Hurlburt Field	16th Special Operations Squadron
Little Rock AFB	50th Airlift Squadron
Randolph AFB	HQ AETC
Randolph AFB	HQ AFPC
Randolph AFB	19th Air Force
Randolph AFB	562nd Flying Training Squadron
Randolph AFB	563rd Flying Training Squadron
Seymour Johnson AFB	335th Fighter Squadron
Tinker AFB	964th Airborne Air Control Squadron

SPECIALTY JOBS

(Utilization Field Structure)

NAVIGATOR UTILIZATION FIELD (12XXX)

The Navigator utilization field encompasses all functions performed by rated navigator officers to conduct or directly support flying operations, including combat, combat support, and training missions. Inherently included are supervisory and staff functions such as inspection, contingency planning, and policy formulation. Each navigator shred, broken down by Air Force Specialty Code (AFSC), is described throughout the following section of this report.

I. AIRLIFT NAVIGATOR - AFSC 12AXX

A total number of 827 officers (as of 20 Aug 99) are currently assigned within this specific navigator job. Officers within this shred can expect to attend their initial Joint Specialized Undergraduate Navigator Training (JSUNT) at Randolph AFB. Airlift navigators can expect to perform technical duties as an aircrew member for a number of years. Airlift navigators can expect leadership opportunities as an instructor navigator or flight commander as a CGO. Currently, airlift navigators can be based at the following USAF installations after completion of initial and weapon system upgrade training: Dyess AFB, TX; Elmendorf AFB, AK; Little Rock AFB, AR; Ramstein AB, Germany; Yokota AB, Japan; Charleston AFB, SC; McChord AFB, WA; McGuire AFB, NJ; Dover AFB, DE; Pope AFB, NC; and Travis AFB, CA.

An example of airlift navigator duties within the C-130 airframe is as follows: From planning to executing, the navigator is an important team member for the operation. He or she collects information, develops a mission plan, usually integrating many different events into one mission. For example, a typical C-130 mission may include takeoff, a high-level airways segment followed by a tactical, low-level route in which the crew performs an airdrop of cargo in the form of supplies, food, or heavy equipment. C-130s are also typically used to infiltrate paratroopers into a given theater. The navigator would plan the entire mission, determine the most appropriate time in flight to airdrop the required cargo or begin the paratrooper employment, and then direct in-flight activities to achieve the mission.

Airlift navigator duties include:

- Reviews mission tasking, intelligence, and weather information
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Plans and prepares for mission
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, estimated times of arrival and estimated fuel consumption

- Performs all pre-flight calculations for airdrop of cargo
- Coordinates airdrop of items/personnel with appropriate organizations prior to launch
- Coordinates aerial refueling requirements with appropriate organizations prior to launch
- Briefs flight plan and aerial refueling plan prior to mission
- Briefs airdrop plan prior to mission
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Inspects and tests (prior to flight) navigational devices such as compasses, radio and radar sets, Global Positioning System (GPS) receivers, Inertial Navigation System (INS) instruments and other navigation sensors
- Navigates aircraft to accomplish assigned mission employing instrument navigation techniques or dead reckoning, aided by map reading, radar, INS, GPS, and sensors as required
- Operates/monitors available navigation systems
- Furnishes pilot and other crewmembers with information on heading to be flown, estimated time of arrival, current position, wind direction and velocity and groundspeed
- Cross-checks on-board navigation equipment against other redundant navigation systems
- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Operates aircraft self-protection systems
- Performs secure communications duties during flight
- Conducts in-flight airdrop tasks
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Airlift navigators can expect to begin flying in one of the following aircraft after completion of JSUNT:



C-5A/B Galaxy

Primary function: Long-range, heavy logistics transport. **Speed:** 541 mph. **Dimensions:** Wingspan 222 ft. 9 in., length 247 ft. 10 in., height 65 ft. 1 in. **Range:** 3,000-6,000 miles depending on cargo. **Crew:** five; six for airdrops.



C-141B Starlifter

Primary function: Long-range troop/cargo airlift. **Speed:** 500 mph. **Dimensions:** Wingspan 160 ft., length 168 ft. 4 in., height 39 ft. 3 in. **Range:** 4,000 miles. **Crew:** five



C-130 Hercules

Primary function: Theater tactical airlift. **Speed:** 374 mph. **Dimensions:** Wingspan 132 ft. 7 in., length 97 ft. 9 in., height 38 ft. 3 in. **Range:** 2,356 miles with cargo; 5,200 miles with none. **Crew:** five.

II. RECONNAISSANCE/SURVEILLANCE NAVIGATOR AND EWO - AFSC 12RXX

A total number of 737 personnel (as of 20 Aug 99) are assigned within this navigator shred. Officers within this shred can expect to attend their initial JSUNT at Randolph AFB. Reconnaissance/surveillance navigators can expect to perform technical duties as an aircrew member for a number of years. Reconnaissance/surveillance navigators can also expect leadership opportunities as an instructor navigator or flight commander as a CGO. Similarly, reconnaissance/surveillance EWOs can expect to attend JSUNT at Randolph AFB. Reconnaissance/surveillance EWOs can also expect leadership opportunities as an instructor EWO or flight commander as a CGO. Currently, reconnaissance/surveillance navigators or EWOs can be based at the following USAF installations after completion of initial weapon system upgrade training: Tinker AFB, OK; Davis-Monthan AFB, AZ; Offutt AFB, NE; Elmendorf AFB, AK; Kadena AB, Japan; and Robins AFB, GA.

Reconnaissance/surveillance navigators are typically utilized as described within the following example: The E-3 navigator is a critical member of the crew working to provide airborne warning and control for strike aircraft within a given theater. The navigator helps to develop a mission flight route that will allow for the constant surveillance of a given area. Navigators are often tasked with performing in-flight re-planning in order to meet updated surveillance requirements and mission needs. Navigators then advise pilots on the maneuvers required to ensure mission success.

An example of how reconnaissance/surveillance EWOs perform work follows: The EWO on the EC-130H COMPASS CALL is in the center of the mission. His/her title is Mission Crew Commander (MCC). The job of this platform is to jam radio communications. The EWO leads the mission crew in performing this task. He/she will lead and direct mission planning with a crew of up to eight enlisted mission specialists--linguists and signal specialists. The MCC plans/directs the placement of the aircraft and operates the jamming system for optimal performance of the mission. The MCC also plans and coordinates COMPASS CALL with other electronic warfare assets and with air operations planners. The platform is air-refuelable with worldwide deployment capability, so missions could be flown in many different arenas.

Reconnaissance/Surveillance navigator duties include:

- Reviews mission tasking, intelligence, and weather information
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Plans and prepares for mission
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, estimated times of arrival and estimated fuel consumption
- Coordinates aerial refueling requirements with appropriate organizations prior to launch
- Briefs flight plan and aerial refueling plan prior to mission
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission

- Inspects and tests (prior to flight) navigational devices such as compasses, radio and radar sets, GPS receivers, INS instruments and other navigation sensors
- Navigates aircraft to accomplish assigned mission employing dead reckoning, aided by map reading, radar, INS, GPS, and sensors as required
- Operates/monitors available navigation systems
- Furnishes pilot and other crewmembers with information on heading to be flown estimated time of arrival, current position, wind direction and velocity and groundspeed
- Cross-checks on-board navigation equipment against other redundant navigation systems
- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Performs all secure communications duties during flight
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Reconnaissance/Surveillance EWO duties include:

- Reviews mission tasking, intelligence, and weather information
- Performs in-depth study of target nation aerial, ground, and naval military capabilities
- Plans for mission by determining the types of enemy radio/radar threats that exist within a given area and when they are most likely to be used during a given conflict
- Acts as mission commander in determining how best to utilize electronic warfare assets during a particular mission
- Determines probable communications systems and frequencies to be encountered during mission
- Plans probable means needed to jam enemy radar and communications systems
- Determines the type of intelligence needed from the actual mission and how that data will be collected
- Coordinates crew actions between flight crew and other EWOs prior to mission
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Operates all available electronic warfare systems on aircraft during flight
- Assesses threats (enemy radar and communications systems) during mission
- Coordinates with navigator to change mission flying route based on threat assessments
- Communicates threats assessment information to home base, intercept aircraft or airborne warning and control systems aircraft real time, providing battlefield situation awareness to decision makers
- Actively jams enemy communications and radar to disable enemy warfighting capabilities
- Uses passive electronic defensive countermeasures during flight
- Tracks enemy conventional and intercontinental ballistic missile launches
- Conducts or supervises training of crewmembers

- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Reconnaissance/surveillance navigators and EWOs can expect to fly in one of the following aircraft after completion of JSUNT (currently E-4B and E-8C are not offered as initial assignments, WC-130H and EC-130E are Reserve and Guard assignments only):



RC-135

Primary function: Reconnaissance. **Speed:** 500 mph. **Dimensions:** Wingspan 130 ft. 10 in., length 140 ft. 6 in., height 38 ft. 8 in. **Range:** 3,000 miles. **Crew:** Up to 30.



WC-130H Hercules

Primary function: Weather reconnaissance; air sampling. **Speed:** 350 mph. **Dimensions:** Wingspan 132 ft. 6 in., length 99 ft. 4 in., height 38 ft. 6 in. **Range:** 4,000 miles. **Crew:** Six.



EC-130H Compass Call

Primary function: Tactical command, control and communications countermeasures. **Speed:** 386 mph. **Dimensions:** Wingspan 132 ft. 7 in., length 97 ft. 9 in., height 38 ft. 3 in. **Range:** 2,500 miles. **Crew:** 13



E-3B Sentry (AWACS)

Primary function: Airborne surveillance; command, control and communications.

Speed: 360 mph. **Dimensions:** Wingspan 130 ft. 10 in., length 145 ft. 6 in., height 41 ft. 4 in.; rotodome — 30 ft. diameter, 6 ft. thick, mounted 11 ft. above fuselage. **Range:** More than 8 hours unrefueled. **Crew:** 17-23.



E-4B

Primary function: Airborne command post.

Dimensions: Wingspan 195 ft. 8 in., length 231 ft. 4 in., height 63 ft. 5 in. **Range:** 12 hours unrefueled. **Crew:** Up to 114.



E-8C Joint STARS

Primary function: Long-range, air-to-ground surveillance system. **Speed:** 630 mph.

Dimensions: Wingspan 145 ft. 9 in., length 152 ft. 11 in., height 42 ft. 6 in. **Range:** 11 hours, 20 hours with refueling. **Crew:** 22.



EC-130E

Primary function: Psychological operations; airborne command, control and communications. **Speed:** 386 mph.

Dimensions: Wingspan 132 ft. 7 in., length 97 ft. 9 in., height 38 ft. 3 in. **Range:** 2,500 miles. **Crew:** 13.



RC-135S Cobra Ball

Primary function: Ballistic Missile Treaty Verification. **Speed:** 500 mph. **Dimensions:** Wingspan 130 ft. 10 in., length 140 ft. 6 in., height 8 ft. **Range:** 3,000 miles. **Crew:** Up to 19.



RC-135V/W Rivet Joint

Primary function: Reconnaissance. **Speed:** 500 mph. **Dimensions:** Wingspan 130 ft. 10 in., length 140 ft. 6 in., height 8 ft. **Range:** 3,000 miles. **Crew:** Up to 30.



RC-135U Combat Sentry

Primary function: Scientific and Technical Data Collection. **Speed:** 500 mph. **Dimensions:** Wingspan 130 ft. 10 in., length 140 ft. 6 in., height 8 ft. **Range:** 3,000 miles. **Crew:** Up to 30.

III. SPECIAL OPERATIONS NAVIGATOR, FIRE CONTROL OFFICER, AND EWO - AFSC 12SXX

A total number of 460 officers (as of 20 Aug 99) are currently assigned within this navigator shred. These officers perform the duties of navigator, fire control officer (FCO), or EWO to accomplish special operations, training, and other assigned missions. Officers within this shred can expect to attend their initial JSUNT at Randolph AFB. Special operations navigators, FCOs, and EWOs can expect to perform technical duties as an aircrew member for a number of years. Officers within this field can expect leadership opportunities as an instructor or flight commander as CGOs. Special operations navigators are currently assigned at the following USAF installations: Hurlburt Field, FL; Eglin AFB, FL; Kadena AB, Japan; Moody AFB, GA; and Mildenhall RAF, UK.

An example of navigator duties within the MC-130 airframe is as follows: From planning to executing, the navigator is in the center of the operation. He/she collects information, analyzes and synthesizes it, and develops a concept of operations, usually integrating many different events into one mission. For example, a typical MC-130 mission may include takeoff, a high-level airways segment followed by a tactical, low-level route using radar terrain following or visual/night vision goggle procedures to an airdrop. There may be a Special Forces team infiltration to a covert drop zone, then an escape to in-flight refuel from a tanker (or conduct refueling of special operations helicopters) to a landing at a blacked-out assault zone and return to base. This entire mission would be planned by the navigators and directed in-flight by the navigators.

Special Operations Navigator duties include:

- Reviews mission tasking, intelligence, and weather information
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Attends briefings to obtain information on type of mission to be performed and conditions under which it must be accomplished (to include hostile areas, day/night, and weather environment)
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, estimated times of arrival and estimated fuel consumption
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Performs all pre-flight calculations for airdrop of cargo/personnel
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Inspects and tests (prior to flight) navigational devices such as compasses, radio and radar sets, GPS receivers, INS instruments or other navigation sensors
- Navigates aircraft to accomplish assigned mission employing instrument navigation techniques or dead reckoning, aided by map reading, radar, INS, GPS, or other sensors as required
- Operates/monitors available navigation systems
- Furnishes pilot and other crewmembers with information on heading to be flown, estimated time of arrival, current position, wind direction and velocity and groundspeed

- Cross-checks on-board navigation equipment against other redundant navigation systems
- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Prior to reaching the designated working area, contacts the tactical controlling agency and obtains strike information
- On receipt of target, alerts crew to monitor target information
- Plots targets and prepares enroute information
- Obtains tactical clearance and briefs crew
- After target acquisition, confirms target and obtains clearance to fire
- Coordinates target validity with pilot and FCO
- During strike, determines aircraft position and clears pilots to fire
- Records strike information
- Checks any malfunctioning equipment
- Maintains flight logs, records, and assigned maintenance risks
- Performs all secure communications duties during flight
- Conducts in-flight airdrop tasks
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Special Operations FCO duties include:

- Attends pre-mission briefings concerning mission tasking, current weather, and intelligence information
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Operates aircraft self-protection systems
- Operates offensive weapons systems during flight by delivering ordnance on a specific target and assesses battle damage
- Monitors fire control display and advises pilot to cease fire if friendly forces are in danger of coming under fire
- Coordinates crew effort in detecting, validating, and destroying targets
- Computes ballistic wind and gun/sensor alignment errors
- Assists navigator in preparation of mission report
- Attends post-mission debriefings when required
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Special Operations EWO duties include:

- Attends pre-mission briefings and assimilates required data and intelligence for given mission
- Plans and prepares for mission
- Performs in-depth study of target nation aerial, ground, and naval military capabilities
- Plans for mission by determining the types of enemy radio/radar threats exist within a given area and when they are most likely to be used during a given conflict
- Determines probable communications systems and frequencies to be encountered during mission
- Plans probable means needed to jam enemy radar and communications systems
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Operates all available electronic warfare systems on aircraft during flight
- Searches for, acquires, and tracks both friendly forces and enemy targets
- Assesses threats (enemy radar and communications systems) during mission
- Coordinates with pilot, navigator, and FCO while monitoring sensors and systems to acquire and attack targets
- Advises crew of area threats and directs appropriate countermeasures
- Actively jams enemy communications and radar to disable enemy warfighting capabilities
- Assists the navigator and FCO in preparation of mission reports
- Attends post-mission briefings
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Special Operations navigators, FCOs and EWOs can expect to begin flying in one the following aircraft after completion of JSUNT:



MC-130E/H Combat Talon I and II

Primary function: Special operations.

Speed: 300 mph. **Dimensions:** Wingspan 132 ft. 7 in., length 97 ft. 9 in., height 38 ft. 4 in. **Range:** 2,000 miles. **Crew:** five.



MC-130P Combat Shadow

Primary function: Special operations.

Speed: 366 mph. **Dimensions:** Wingspan 132 ft. 7 in., length 98 ft. 9 in., height 38 ft. 6 in. **Range:** 4,000 miles. **Crew:** eight.



AC-130H/U Spectre

Primary function: Special operations.

Speed: 300 mph. **Dimensions:** Wingspan 132 ft. 7 in., length 97 ft. 9 in., height 38 ft. 3 in. **Range:** 1,500 miles. **Armament:** 130H—Two 20mm Vulcan cannons with 3,000 rounds, one 40mm Bofors cannon and one 105mm howitzer; 130U—One 25mm Gatling gun, one 40mm Bofors cannon and one 105mm cannon. **Crew:** 130H, 13; 130U, 14

IV. TANKER NAVIGATOR – AFSC 12TXX

A total number of 504 officers (as of 20 Aug 99) are currently assigned as tanker navigators. Officers within this track perform the duties of navigator to accomplish air refueling, training, and other assigned missions. Officers within this track can expect to attend their initial JSUNT at Randolph AFB. Tanker navigators can expect to perform technical duties as an aircrew member for a number of years. Tanker navigators can expect leadership opportunities as an instructor navigator or flight commander as a CGO. Tanker navigators are currently assigned to the following USAF installations: Fairchild AFB, WA; Grand Forks AFB, ND; Kadena AB, Japan; MacDill AFB, FL; McConnell AFB, KS; Mildenhall RAF, UK; Mountain Home AFB, ID; and Robins AFB, GA.

Navigators are critical members of the KC-135 team that provides global reach and engagement for Air Force aircraft worldwide. As KC-135 crews are tasked with providing in-flight refueling for fighter, bomber, airlift, reconnaissance, and other refueling aircraft. Mission profiles change often based on the need of a given package of aircraft. For example, during Operation Noble Anvil, B-2s flew from Whiteman AFB in MO to the former Republic of Yugoslavia to deliver precision weapons during the first days of the Kosovo air campaign. The B-2s were able to complete a non-stop 31 hour mission because of air refueling support provided by numerous KC-135 Stratotankers. In this type of situation, navigators work to develop a flight route that will allow the KC-135 to be ready to refuel strike aircraft at exactly the time and position needed. Navigators constantly recalculate flight routes to ensure the KC-135 is at the required rendezvous point on time.

Tanker navigator duties include:

- Reviews mission tasking, intelligence, and weather information
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Plans and prepares for mission
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, estimated times of arrival and estimated fuel consumption
- Coordinates aerial refueling requirements with appropriate organizations prior to launch
- Briefs flight plan and aerial refueling plan prior to mission
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Inspects and tests (prior to flight) navigational devices such as compasses, radio and radar sets, GPS receivers, INS instruments and other navigation sensors
- Navigates aircraft to accomplish assigned mission employing dead reckoning, aided by map reading, radar, INS, GPS, and sensors as required
- Operates/monitors available navigation systems
- Furnishes pilot and other crewmembers with information on heading to be flown estimated time of arrival, current position, wind direction and velocity, and groundspeed
- Cross-checks on-board navigation equipment against other redundant navigation systems

- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Performs all secure communications duties during flight
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Tanker navigators can expect to fly in the following aircraft after completing initial training:



V. FIGHTER WSO and EWO - AFSC 12FXX

A total number of 830 officers (as of 20 Aug 99) are currently assigned within this navigator job. Officers within this shred perform duties of WSO and EWO to accomplish combat, training, and other assigned missions. Officers within this shred can expect to attend JSUNT at NAS Pensacola. After initial training completion, officers can expect to complete the technical duties of a WSO/EWO throughout their time as a CGO. Officers can expect to upgrade to the level of instructor during their time as a CGO. Additionally, EWO training at Randolph AFB is offered to selected experienced WSOs to fill EWO positions in each fighter wing. Further upgrade to mission commander status will be required of those who wish to pursue further leadership roles in their careers. Fighter WSOs/EWOs are currently based at the following USAF installations: Seymour Johnson AFB, NC; Elmendorf AFB, AK; Lakenheath RAF, UK; and Mountain Home AFB, ID.

An example of WSO duties are as follows: A fighter WSO is an integral part of the two-person crew of the F-15E. The pilot and WSO work together in a dynamic environment to complete the multitask mission of the Strike Eagle: to fight into a heavily guarded area, prosecute a precision attack on a target, and fight back out. In an air-to-air arena, the WSO is responsible for developing the air attack gameplan, which includes targeting responsibilities, formation maneuvering to facilitate intercept geometry, shot doctrine, and coordination with other strike package assets. In the air-to-ground arena, the WSO is tasked with a very important part of the mission - how to find and kill the target. This includes flight plan programming, briefing target area penetration and identification, air and ground threat reactions, management of on-board sensors, and ultimately laser guiding the munition to the target.

WSO and EWO duties include:

- Reviews mission tasking, intelligence, and weather information
- Plans and prepares for mission:
- Determines air-to-air defense and attack strategies should enemy aircraft or weapons systems be encountered during mission
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, ETAs and estimated fuel consumption
- Plans out the navigation route to the designed air-to-ground target
- Plans strategies for strike package organization (which type of aircraft and weapons are needed for a particular mission)
- Briefs air-to-air defense strategy, navigation plans, and strike plan to fellow crew members
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Briefs weapons settings, ensures proper loading of weapons

- Inspects and tests (prior to flight) navigational devices such radio and radar sets, GPS receivers, INS instruments or other navigation sensors
- Operates/monitors available navigation systems
- Cross-checks on-board navigation equipment against other redundant navigation systems
- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Works with pilot to perform basic fighter maneuvers (offensive/defensive counter-air maneuvers)
- Deploys active countermeasures (chaff and flare) and performs visual scans for enemy contacts
- Utilizes bombing and radar systems to acquire air or ground targets
- Guides laser-guided bombs on to target using targeting pod or bomb guidance system
- Monitors radar and enemy aircraft interception systems
- Employs electronic countermeasures to jam enemy radar
- Operates available navigation systems
- Debriefs mission completion with strike package crew members
- Reviews mission performance to enhance future mission effectiveness
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Officers within the fighter navigator community can expect to fly in one of the two different weapon systems below (currently EA-6Bs are not given on initial assignment. Air Force officers currently serving in joint assignments in the EA-6B are experienced F-15E WSOs that have received subsequent EWO training):



F-15E Eagle

Primary function: Air superiority tactical fighter. E model is a totally integrated fighter for air-to-air and deep interdiction missions. **Speed:** 1,875 mph.

Dimensions: Wingspan 42 ft. 9 in., length 63 ft. 9 in., height 18 ft. 7 1/2 in. Range: 3,450 miles. **Armament:** One M-61A1 20mm multibarrel gun, four AIM-9L/M Sidewinder missiles and four AIM-7F/M Sparrow missiles, or a combination of AIM-9LM, AIM-7-F/M and AIM-120 missiles. **Crew:** one in F-15C; two F-15D; two in F-15E.



EA-6B Prowler

Primary function: Tactical electronic countermeasures. **Speed:** 0.99 mach.

Dimensions: Wingspan 53 ft., length 59 ft., height 15 ft., Range: 977.5 miles unrefueled.

Armament: ALQ-99 Tactical Jamming System (TJS); High Speed Anti-Radiation Missile (HARM). **Crew:** four.

VI. BOMBER NAVIGATOR AND EWO - AFSC 12BXX

A total number of 954 personnel (as of 20 Aug 99) are currently assigned within this navigator job. Officers within this shred perform duties of navigator, EWO or WSO to accomplish combat, training, and other assigned missions. In particular, within the B-52 community, a navigator can complete duties as a bomber navigator, EWO, or radar navigator. Typically, a B-52 navigator will upgrade to the position of radar navigator through extensive training and experience. Within the B-1 community, a navigator can expect to become a WSO. B-1 WSOs will perform both the duties of both the navigator and EWO within their specific airframe.

Initial training for officers in the bomber track is very complex. B-1B WSOs attend JSUNT at NAS Pensacola. After graduation, they join an EWO class at Randolph AFB. B-52 navigators also attend JSUNT at NAS Pensacola. B-52 EWOs attend JSUNT at Randolph AFB. After initial training completion, officers can expect to complete the technical duties of a bomber navigator, WSO, or EWO throughout their time as a CGO. Officers can expect to upgrade to the level of instructor during their time as a CGO. Further upgrade to a radar navigator within the B-52 community (for B-52 navigators) will be required of those who wish to pursue further leadership roles in their careers. B-52s are based at Barksdale AFB, LA and Minot AFB, ND. B-1s are based at Dyess AFB, TX; Mountain Home AFB, ID; and Ellsworth AFB, SD.

An example of the roles of the navigator, radar navigator, and EWO positions on the B-52 Stratofortress is as follows: The navigator and the radar navigator on a B-52 crew can best be thought of as mission managers. The navigators are responsible for analyzing and incorporating data from a wide range of sources and organizing it into the mission profile and route of flight. They must be proficient in the use of a large assortment of navigational equipment to ensure the mission's success. The navigators are also responsible for weapons preflight, employment and release. The B-52 EWO is responsible for defending the aircraft from enemy air and surface launched anti-aircraft weapons. The EWO will review intelligence data on enemy air-defense systems and assist in planning the mission route to minimize the possibility of attack to the aircraft. He or she will then monitor radar-warning equipment during the flight and counter enemy radar systems with electronic jamming, chaff or flares and by directing the aircraft away from the danger area. A typical B-52 mission profile would begin with a high-level cruise segment, usually over open-ocean and through both national and international airspace. The mission will include one or more air refuelings enroute to the combat area and then a rendezvous with other aircraft in a strike package. The aircrews will then launch cruise missiles at their designated targets or fly over enemy territory to the targets to release other types of weapons. They will then recover from the mission by either returning to where they took off from or to another airfield.

B-1 WSO duties include:

- Reviews or is briefed on mission tasking, intelligence, and weather information
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Uses information systems and other resources to determine the type of munition or bomb which will be most effective for a particular mission tasking
- Plans and prepares for mission: determines air defense and attack strategies should enemy aircraft or weapons systems be encountered during mission
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, estimated times of arrival, and estimated fuel consumption
- Plans out the navigation route to the designed bombing target
- Plans strategies for strike package organization (which type of aircraft and weapons are needed for a particular mission)
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Determines safe escape routes and separation distances between bomb and aircraft flight path
- Coordinates the air-fueling plan
- Coordinates with fighter aircraft members of strike package for interceptor support
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Inspects and tests (prior to flight) navigational devices such as compasses, radio and radar sets, GPS receivers, INS instruments and other navigation sensors
- Navigates aircraft to accomplish assigned mission employing dead reckoning, aided by map reading, radar, INS, GPS, or other sensors as required
- Operates/monitors available navigation systems
- Furnishes pilot and other crewmembers with information on heading to be flown estimated times of arrival, current position, wind direction and velocity and groundspeed
- Cross-checks on-board navigation equipment against other redundant navigation systems
- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Operates aircraft defensive electronic countermeasures and expendables (chaff and flare)
- Works with pilot to perform strategic bombing maneuvers (offensive/defensive counter air maneuvers)
- Uses bombing and radar systems to acquire targets
- Monitors radar and enemy aircraft interception systems
- Monitors weapon status during flight
- Employs bombs or other munitions on targets using on-board systems
- Employs electronic countermeasures to jam enemy radar
- Debriefs mission completion with strike package crew members
- Review mission performance to enhance future mission effectiveness
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training

- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

B-52 Radar Navigator/Navigator duties include:

- Reviews or is briefed on mission tasking, intelligence, and weather information
- Obtains navigational data and equipment such as maps, charts, flight publications, and navigational instruments needed for the mission
- Uses information systems and other resources to determine the type of munition or bomb which will be most effective for a particular mission tasking
- Prepares a detailed navigational flight plan based on latest weather and intelligence information including route of flight, headings and altitudes to be flown, checkpoints, estimated times of arrival, and estimated fuel consumption
- Plans out the navigation route to the designed bombing target
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Determines safe escape routes and separation distances between bomb and aircraft flight path
- Coordinates the air-fueling plan
- Coordinates with fighter aircraft members of strike package for interceptor support
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Inspects and tests (prior to flight) navigational devices such as compasses, radio and radar sets, GPS receivers, INS instruments and other navigation sensors
- Navigates aircraft to accomplish assigned mission employing dead reckoning, aided by map reading, radar, INS, GPS, or other sensors as required
- Operates/monitors available navigation systems
- Furnishes pilot and other crewmembers with information on heading to be flown estimated times of arrival, current position, wind direction and velocity, and groundspeed
- Cross-checks on-board navigation equipment against other redundant navigation systems
- Performs in-flight mission re-planning adjustments concerning course, time, speed, and fuel management
- Coordinates in-flight changes to flight plan based on mission requirements
- Operates satellite communications systems
- Utilizes bombing and radar systems to acquire targets
- Monitors weapon status during flight
- Employs bombs or other munitions on targets using on-board systems
- Debriefs mission completion with strike package crew members
- Review mission performance to enhance future mission effectiveness
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

B-52 EWO duties include:

- Reviews mission tasking, intelligence, and weather information
- Performs in-depth study of target nation aerial, ground, and naval military capabilities
- Plans for mission by determining the types of enemy radio/radar threats that exist within a given area and when they are most likely to be used during a given conflict
- Acts as mission commander in determining how best to utilize electronic warfare assets during a particular mission
- Determines probable communications systems and frequencies to be encountered during mission
- Plans probable means needed to jam enemy radar and communications systems
- Determines the type of intelligence needed from the actual mission and how that data will be collected
- Coordinates actions between flight crew and other EWOs prior to mission
- Participates in mission planning, preparation and filing of flight plan, and crew briefing
- Ensures aircraft is pre-flighted, inspected, loaded, equipped, and manned for mission
- Operates all available electronic warfare systems on aircraft during flight
- Assess threats (enemy radar and communications systems) during mission
- Coordinates with navigator to change mission flying route based on threat assessments
- Monitors radar and enemy aircraft interception systems
- Communicates threats assessment information to home base, intercept aircraft or airborne warning and control systems aircraft real time, providing battlefield situation awareness to decision makers
- Actively jams enemy communications and radar to disable enemy warfighting capabilities
- Employs electronic countermeasures
- Uses passive electronic defensive countermeasures during flight
- Tracks enemy conventional and intercontinental ballistic missile launches
- Conducts or supervises training of crewmembers
- Ensures operational readiness of crew by conducting or supervising mission specific training
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

As mentioned, bomber navigators or EWOs can expect to fly in one of the following aircraft:



B-1B Lancer

Primary function: Multirole, long-range heavy bomber. **Speed:** 900 mph.

Dimensions: Wingspan 137 ft. (79 ft. with wings swept aft), length 146 ft., height 34 ft.

Range: Intercontinental. **Armament:** Conventional, including MK-82 500 lb. conventional bombs, and CBU-87 and CBU-97 cluster bomb units. **Crew:** four.



B-52H Stratofortress

Primary function: Long-range heavy bomber.

Speed: 650 mph. **Dimensions:** Wingspan 185 ft., length 159 ft. 4 in., height 40 ft. 8 in.

Range: Intercontinental. **Armament:** 70,000 lbs. of mixed ordnance, including short-range attack missiles, bombs, mines, air-launched cruise missiles and anti-ship missiles. **Crew:** five.

VII. EXPERIMENTAL TEST NAVIGATOR - AFSC 12EXX

A total number of 31 officers (as of 20 Aug 99) are currently assigned within this specific navigator job. Officers within this shred plan, conduct, direct, and report on flight test programs associated with the design, development, and modification of aircraft, aerospace vehicles, flight simulators, and related systems. Officers within this specific navigator job could be trained within either of the two major training pipelines. Accession into the test navigator ranks will depend to a large degree on duty performance within one of the other navigator jobs described within this report.

Test navigator duties include:

- Plans and conducts flight-test programs
- Formulates test procedures and conducts tests to evaluate structural integrity, performance, handling characteristics, reliability, and suitability of aircraft and systems
- Manages research, test and evaluation projects, and programs Integrates test objectives, organizes and directs test forces, supervises flight operations
- Identifies design and operational deficiencies and recommends improvements
- Prepares technical reports and recommends design improvements
- Develops plans and policies, monitors operations, and advises commanders
- Assists commanders and performs staff functions related to this specialty

Officers within this track can expect to attend their initial JSUNT at Randolph AFB or NAS Pensacola. However, only experienced navigators with a specified number of flight hours will be considered for this position. Also, specialized Acquisition Professional Development Program training as well as Air Force Test Pilot School, Experimental Test Navigator Course, or equivalent U.S. Navy or foreign test navigator courses are required of officers who enter the test navigator shred. Test navigators can expect to fly and test fighter, bomber, airlift, tanker, special operations, or reconnaissance aircraft depending on their previous flying background.

VIII. GENERALIST NAVIGATOR - 12GXX

A total number of 158 officers (as of 20 Aug 99) are currently assigned within this specific navigator job. Officers within this shred develop plans and policy, monitor and evaluate operations, coordinate staff activities and advise commanders. Officers within this specific navigator job could be trained within either of the two major training pipelines. Accession into the generalist navigator ranks will depend to a large degree on duty performance within one of the other navigator jobs described within this report as well as time in service. Typically, navigators assigned as generalists are majors or lieutenant colonels serving as staff officers at a Major Command (MAJCOM) headquarters, field operating agency or other unit.

Generalist Navigator duties include:

- Monitors, evaluates, or directs flying operations and training programs
- Develops requirements for equipment and training
- Prepares and coordinates budgets
- Analyzes rated manpower requirements and formulates personnel policies
- Prepares, coordinates, and disseminates policy directives and instructions
- Develops contingency plans

Officers within this track can expect to attend their initial JSUNT at Randolph AFB or NAS Pensacola. However, as previously mentioned navigators serving as generalists are senior in rank and are serving as staff officers. Navigators completing initial training are not currently assigned as generalist navigators.

IMPLICATIONS

There are numerous implications from this report for officers or cadets who are considering becoming Air Force navigators. To begin, the information within this document has provided the basic understanding of the tasks, responsibilities, and possible career progression for navigators across all major weapon systems. Thus, the information to make an educated decision on which training pipeline to pursue is available. Again, prospective navigators will have to designate their preferences on the type of navigator they want to become: airlift/tanker navigator, EWO, fighter WSO, or bomber navigator. This document has described how each specific job within AFSC 12XXX fits within the two larger training pipelines. It is evident throughout this document that navigators perform some similar duties across all the major weapon systems. It is the unique mission of the actual aircraft and the duties required within specific missions that causes the distinction between the different navigator tracks.

Future navigators should strongly consider the unique mission in particular when considering the track they intend to pursue. Further information concerning these missions and the community in which navigators will work can be gleaned from official Air Force websites that can be accessed via <http://www.af.mil>.